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**HAHN AND ASSOCIATES, INC.**  
ENVIRONMENTAL CONSULTANTS

**MEMORANDUM**

**DATE:** May 5, 2005

**TO:** Mr. Bill Robertson  
Oregon Department of Environmental Quality  
Portland, Oregon

**FROM:** Ms. Jill Betts ([jillb@hahnenv.com](mailto:jillb@hahnenv.com))  
Hahn and Associates, Inc.  
Portland, Oregon

HAI Project No. 6235

**SUBJECT:** Summary of Findings from April 2005 Site Investigation  
Lakeside Industries, 4850 NW Front Avenue, Portland, Oregon

Hahn and Associates, Inc. (HAI) has prepared this technical memorandum that summarizes the findings of the April 1, 2005 site investigation at the above-referenced Lakeside Industries facility. As stated in the Work Plan for Site Investigation Activities<sup>1</sup> (Work Plan), the subsurface investigation was conducted to:

1. Determine if four historically-mapped drywells are present on the property, and if so, assess the drywells for closure
2. Test groundwater down-gradient of UIC #2 to evaluate the "groundwater to surface pathway" to the Willamette River for ecological receptors
3. Test groundwater down-gradient of the former blind sump located inside the truck shop to evaluate the "groundwater to surface pathway" to the Willamette River for ecological receptors.

HAI followed the procedures written in the Work Plan for all geophysical survey, subsurface investigation, analytical testing, and quality control sampling activities, with the following exceptions:

- Since no drywells were discovered at proposed boring locations P-9 and P-10, these borings were not installed
- Since no drywells were discovered at boring locations P-7 and P-8, no soil samples were selected for analytical testing from these borings
- Since impacts to soil were observed at boring P-6, two samples were collected at this location for analytical testing for petroleum hydrocarbons

The results of the geophysical survey, subsurface investigation, and analytical testing are discussed below.

**1.0 Results of Assessment for Drywells**

On March 30, 2005, HAI oversaw the completion of geophysical survey activities in the areas of historically-mapped drywells as identified in the Work Plan. The geophysical

<sup>1</sup> Hahn and Associates, Inc. (2005). *Work Plan for Site Investigation Activities, Lakeside Industries, 4850 NW Front Avenue, Portland, Oregon*. February 16, 2005.

survey was conducted by GeoPotential of Gresham, Oregon using ground penetrating radar (GPR) equipment. The geophysical survey areas are shown on Figure 2.

Geophysical anomalies identified by the geophysical survey were directly investigated by the installation of test pits. The survey and subsequent test pitting activities did not identify any Underground Injection Control (UIC) devices (drywells) or remnants of UICs at any of the survey locations.

Fill material was unearthed during test pitting activities in the vicinity of the anomaly located at push probe boring P-8. The fill material consisted of wood debris and metal rods, with some wood debris that appeared to be externally treated with an oily substance. The oily substance had not penetrated significantly into the wood, and a very faint petroleum hydrocarbon odor was detected, but no sheen or free product was observed. Based on the cut dimensions of the wood debris and size of the metal rods, the fill material may have been associated with a former dock that had been demolished.

Subsequent push probe boring installations in the area indicate the wood debris extends to a depth of approximately 10 feet below ground surface (bgs). The northern and eastern extent of the fill material could not be determined due to the large aggregate piles that were unable to be relocated on the subject property (Figure 2). Field screening of the soil material below the wood debris at boring location P-8 did not show indications of contamination.

## 2.0 Results of Site Investigation Activities

Four push probes (i.e., P-5, P-6, P-7, and P-8) were installed during the April 2005 site investigation (Figure 2). Boring P-5 was installed immediately down-gradient of the decommissioned UIC #2 to evaluate groundwater at this former drywell location. Borings P-6, P-7, and P-8 were installed at possible down-gradient locations with respect to the Truck Shop. Proposed borings P-9 and P-10 were not installed since no drywells were discovered at these locations. Groundwater was encountered between depths of 25.5 and 26.5 feet bgs in the borings.

### 2.1 Soil Testing Results

Field screening indicated possible petroleum hydrocarbon impact of soil in boring P-6 between depths of 1.5 and 2.5 feet bgs and between 11.0 and 12.0 feet bgs. Analytical testing indicated 164 parts per million (ppm) diesel-range petroleum hydrocarbons were present in soil at 1.5 to 2.0 feet bgs, and soil at 11.0 to 11.5 feet bgs contained 10.7 ppm gasoline-range, 342 ppm diesel-range, and 223 ppm oil-range petroleum hydrocarbons (Table 1). None of the detected petroleum hydrocarbon concentrations were above DEQ Level 2 Soil Matrix Cleanup Standards (OAR 340-122-0335). The source(s) of the detected petroleum hydrocarbons at boring P-6 are not known.

Field screening of soil at the borings down-gradient of UIC #2 (P-5), down-gradient of the Truck Shop (P-7), and beneath the wood debris (P-8) did not indicate the presence of soil impacts.

### 2.2 Groundwater Testing Results

Screening-level groundwater samples were collected from temporary well points placed in each of the four borings, with a duplicate groundwater sample collected at boring P-5.

The groundwater samples were collected from uppermost groundwater with a screen interval from 26 to 30 feet bgs at each location.

#### Polynuclear Aromatic Hydrocarbons (PAHs)

Analytical testing indicates polynuclear aromatic hydrocarbons (PAHs) were detected at low concentrations in the groundwater samples from all locations, with total PAH concentrations ranging from 0.56 parts per billion (ppb) to 1.93 ppb (Table 2). The detected levels of benzo(a)anthracene and benzo(a)pyrene at borings P-5 and P-6 are above ecological screening levels for fresh water surface water receptors, which would only be of potential concern if similar levels were migrating to the Willamette River in groundwater. It should be noted that the groundwater sample from boring P-8, located closer to the river than the other three borings, did not contain PAHs at concentrations exceeding ecologic screening levels.

Since the PAH testing was conducted on turbid unfiltered samples, it is suspected that the detected PAHs in the samples are related to sampling-induced suspension of solids containing PAHs, rather than the presence of PAHs in dissolved form. The detection of low levels of PAHs is common in groundwater samples collected from other Portland Harbor properties that have had a history of significant fill placement along the Willamette River.

#### Metals

As indicated in the Work Plan, since turbidity measurements were above 50 NTU in each groundwater sample, both total (unfiltered) metals and filtered metals (i.e., using an 11-micron filter) were analyzed for each groundwater sample. The purpose of the 11-micron filtering is to knockout the sampling induced turbidity and suspended solids that are common to screening-level groundwater samples collected from borings.

As suspected, the unfiltered total basis groundwater samples collected at the site showed relatively high levels of metals (Table 2). The 11-micron filtered samples, which should better reflect actual conditions in the groundwater, showed much reduced levels of metals in groundwater samples, with only arsenic and barium detected at concentrations that exceed risk screening levels (Table 2). Arsenic was detected at only one location (at boring P-7), at a concentration of 1.03 ppb, which is above the U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remedial Goal (PRG) for Tap Water of 0.045 ppb. Barium was detected at each location at concentrations ranging from 28.3 to 62.2 ppb, which are above the lowest DEQ ecological Level II Screening Level Value (SLV) for fresh surface water receptors of 4 ppb.

Testing of select samples for dissolved (0.45-micron filtered) metals, resulted in similar concentrations indicating that these metals, barium in particular, appear to be present in the dissolved form.

It is suspected that the detected arsenic and barium related to background concentrations that are present in uppermost water of this area. Furthermore, neither arsenic nor barium would be considered chemicals of interest at the subject property based on past and current site uses.

#### Halogenated Volatile Organic Compounds (HVOCs)

Analytical testing of groundwater samples collected during the subsurface investigation indicate halogenated volatile organic compounds (HVOCs) were detected at three (i.e. P-5, P-7, and P-8) of the four groundwater sampling locations. Aromatic VOCs were not

detected in groundwater above method detection limits at any of the boring locations. As discussed below, the detected HVOCs in groundwater are attributed to a known plume of HVOC contamination that originates on the adjacent Gunderson property to the southeast.

Analytical testing of groundwater in borings P-5, P-7, and P-8 detected the following HVOCs (Table 2):

Chloroform, chloroethane, 1,1-dichloroethane (1,1-DCA), 1,2-DCA, 1,1-dichloroethene (1,1-DCE), cis-1,2-DCE, 1,1,1-trichloroethane (1,1,1-TCA), and 1,1,2-TCA.

The highest total HVOC concentrations in groundwater were found at boring P-8 (1,282 ppb), with much lower levels found at locations P-5 (14.6 ppb) and P-7 (5.4 ppb). Figure 3 depicts the results of the groundwater testing conducted by HAI (total HVOCs), as well as the results of groundwater testing conducted by Gunderson on and adjacent to the Lakeside Industries property.

Gunderson has previously mapped an HVOC plume in the groundwater beneath the eastern portion of the Lakeside Industries property that originates to the southeast on the Gunderson property. Vertically, this plume is present from uppermost groundwater (25 to 30 feet bgs) to deeper within the basalt bedrock aquifer (40 to 50 feet or greater) depending on location. The primary contaminant released at the Gunderson property was 1,1,1-TCA. However, through natural degradation processes, a whole suite of degradation products is also found in the groundwater at varying percentages.

The concentrations, distribution, and suites of HVOCs found in borings P-5, P-7, and P-8 are generally consistent with the information collected by Gunderson. The suite of VOCs at boring P-8 is consistent with significant degradation of a TCA plume, but shows more advanced degradation than any Gunderson sampling event (see Chart 1). Chart 1 shows the ratio of various HVOCs in groundwater at a number of key Lakeside and Gunderson sampling locations, and also shows HVOC ratio changes through time at a number of Gunderson monitoring wells. This chart shows that degradation is occurring at all locations. Note particularly the rapid degradation of TCA at well WEX-60 from April 2002 to November 2004.

The lack of detectable HVOCs in the groundwater sample from P-6 is consistent with the vertical distribution of HVOCs observed at Gunderson well pair MW-20/MW-39 and at push probe location GP-LI1 where very low to non-detectable levels of HVOCs were found in the uppermost groundwater, while higher levels were found in deeper zones.

The preponderance of information at the site indicates that the detected HVOCs in groundwater at borings P-5, P-7, and P-8 are related to the Gunderson plume and not a source area at the Lakeside Industries Truck Shop.

### 3.0 Conclusions

In summary, the following conclusions can be made subsequent to the site investigation:

- No dry wells (i.e., UICs) were identified by the geophysical survey activities.
- Two thin zones of low-level petroleum impact were identified at boring P-6 (located northeast of the Truck Shop), the source(s) for which are not known.

The lack of groundwater contamination at boring P-6 indicates the contaminated soil has not impacted groundwater.

- The detection of low levels of PAHs in all screening-level groundwater samples is attributed to sampling-induced suspension of solids containing PAHs. A likely source of the PAHs is from the fill soils historically placed at the site to bring the property to current grade.
- The detection of metals in all unfiltered groundwater samples is attributed to sampling-induced turbidity and suspension of solids. Metals concentrations were much reduced in groundwater samples filtered with an 11-micron filter, better reflecting actual conditions in the groundwater. In the filtered samples, only arsenic and barium were detected at concentrations that exceed risk screening levels. However, it is suspected the detected arsenic and barium concentrations are related to background levels present in uppermost water of this area. Furthermore, neither arsenic nor barium would be considered chemicals of interest at the subject property based on past and current site uses.
- The detection of HVOCs at three of four groundwater sampling locations is attributed to a known plume of HVOC contamination that originates on the adjacent Gunderson property to the southeast. The distribution and suites of HVOCs found in groundwater beneath the Lakeside Industries property are consistent with a degrading TCA plume originating on the Gunderson property.
- The preceding information indicates that UIC #2 and the Truck Shop do not appear to have impacted groundwater to an extent that would justify further investigation and/or other actions by Lakeside Industries.

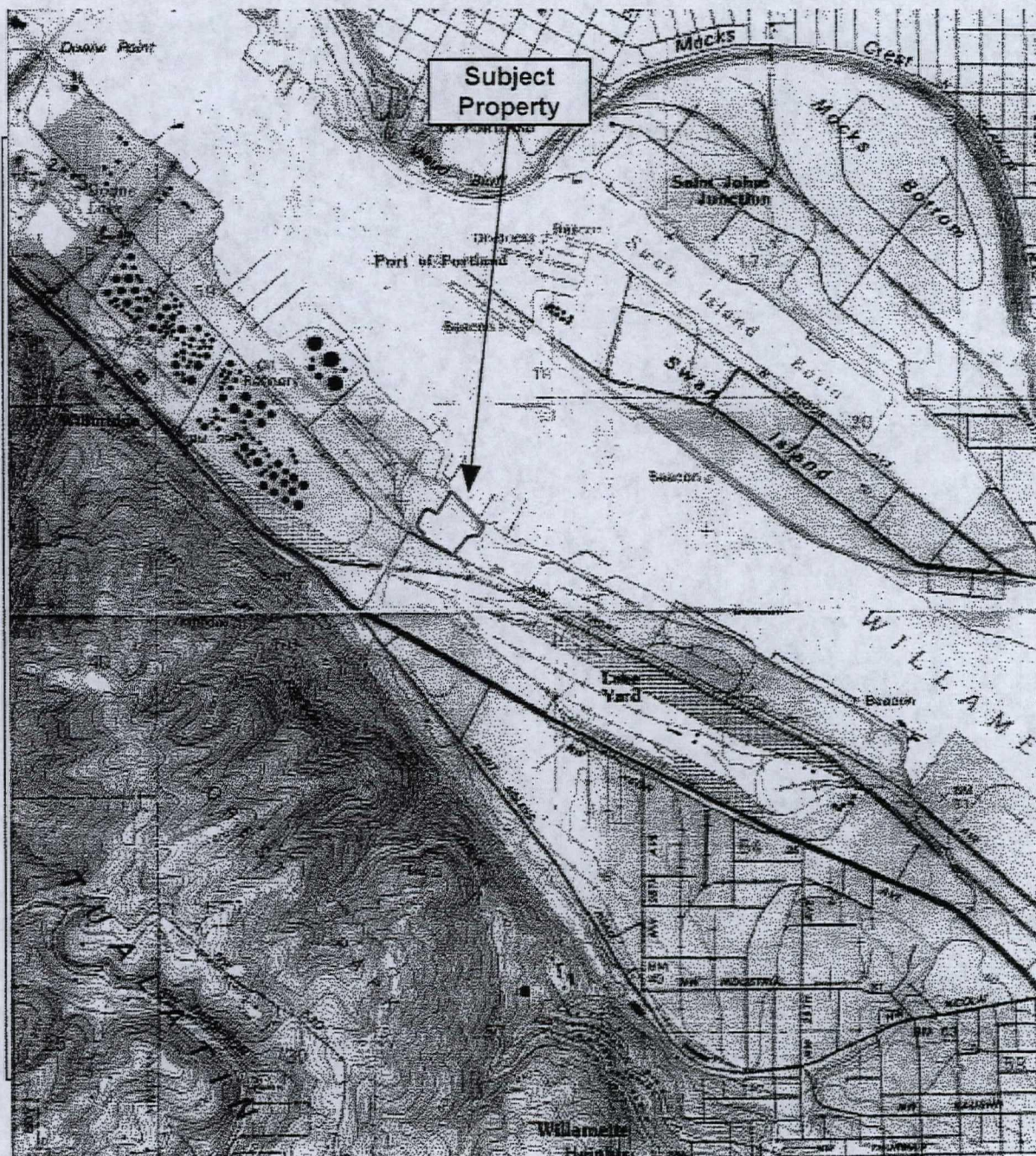
Attachments: 8

- 1) Figure 1 – Location Map
- 2) Figure 2 – Site Map
- 3) Figure 3 – Total HVOCs in Groundwater
- 4) Chart 1 – HVOC Ratios in Groundwater
- 5) Table 1 – Summary of Soil Testing Results
- 6) Table 2 – Summary of Groundwater Testing Results
- 7) Field Boring Logs
- 8) Analytical Laboratory Reports and Chain of Custodies

**ATTACHMENT 1**

Figure 1 - Location Map





Note: Base Map from the Portland, Oregon (1990)  
USGS 7.5-Minute Quadrangle  
Contour Interval: 10 Feet



0 2000 4000  
Scale in Feet

## FIGURE 1

### Location Map

Site Investigation Activities  
Lakeside Industries  
4850 NW Front Avenue  
Portland, Oregon

HAHN AND ASSOCIATES, INC.

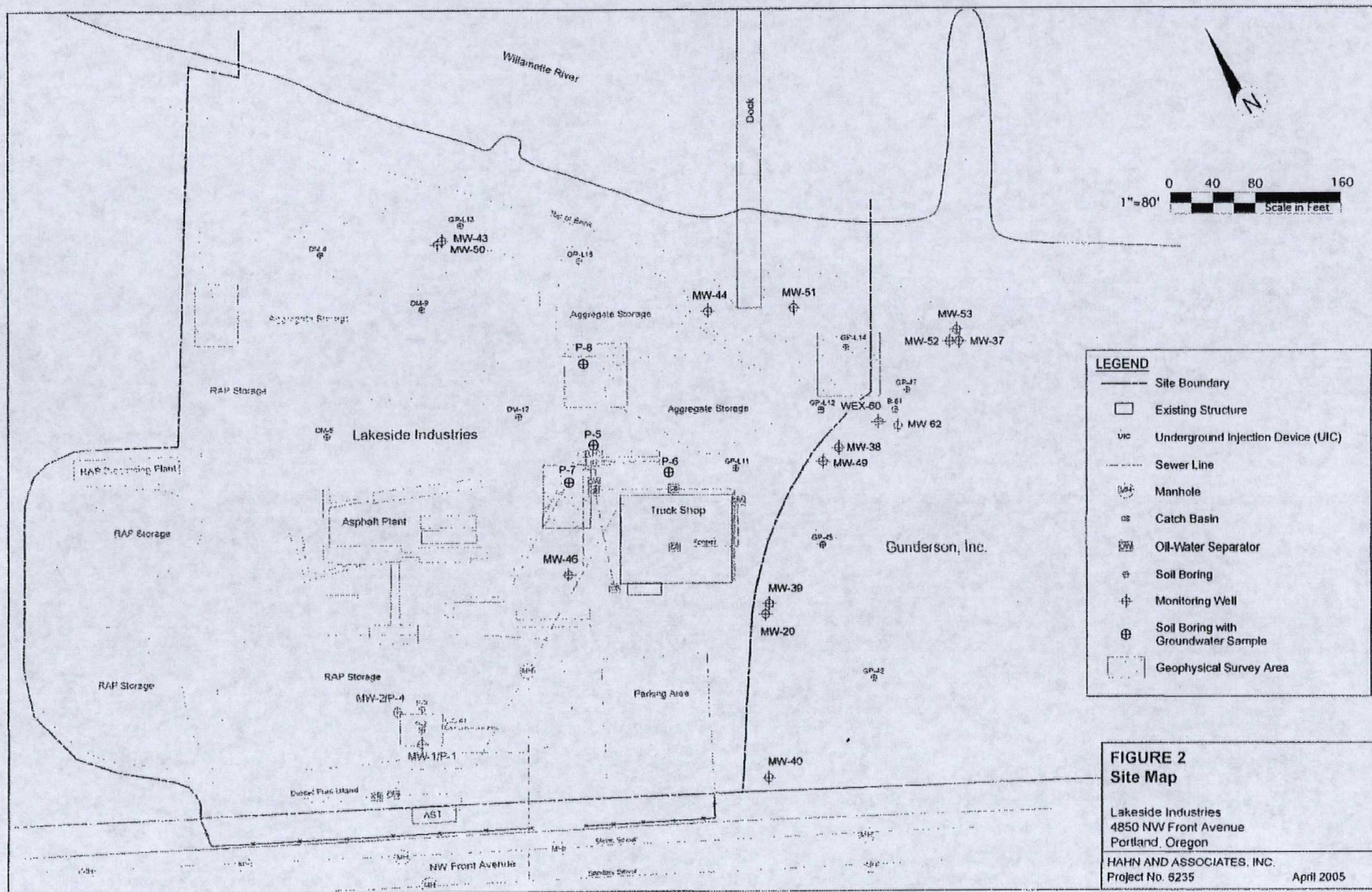
Project No. 6235

April 2005



**ATTACHMENT 2**

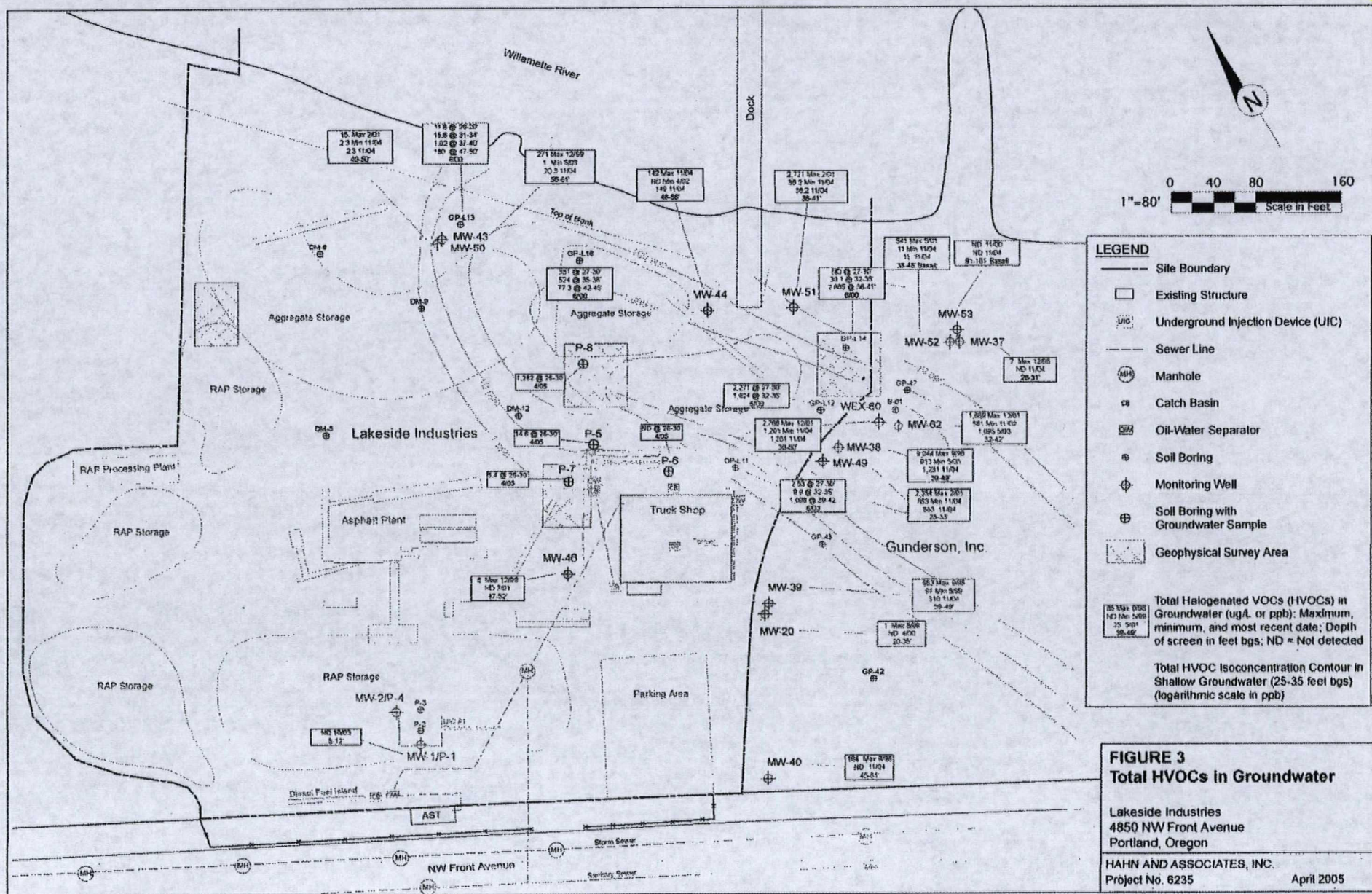
Figure 2 - Site Map



**ATTACHMENT 3**

**Figure 3 - Total HVOCs in Groundwater**





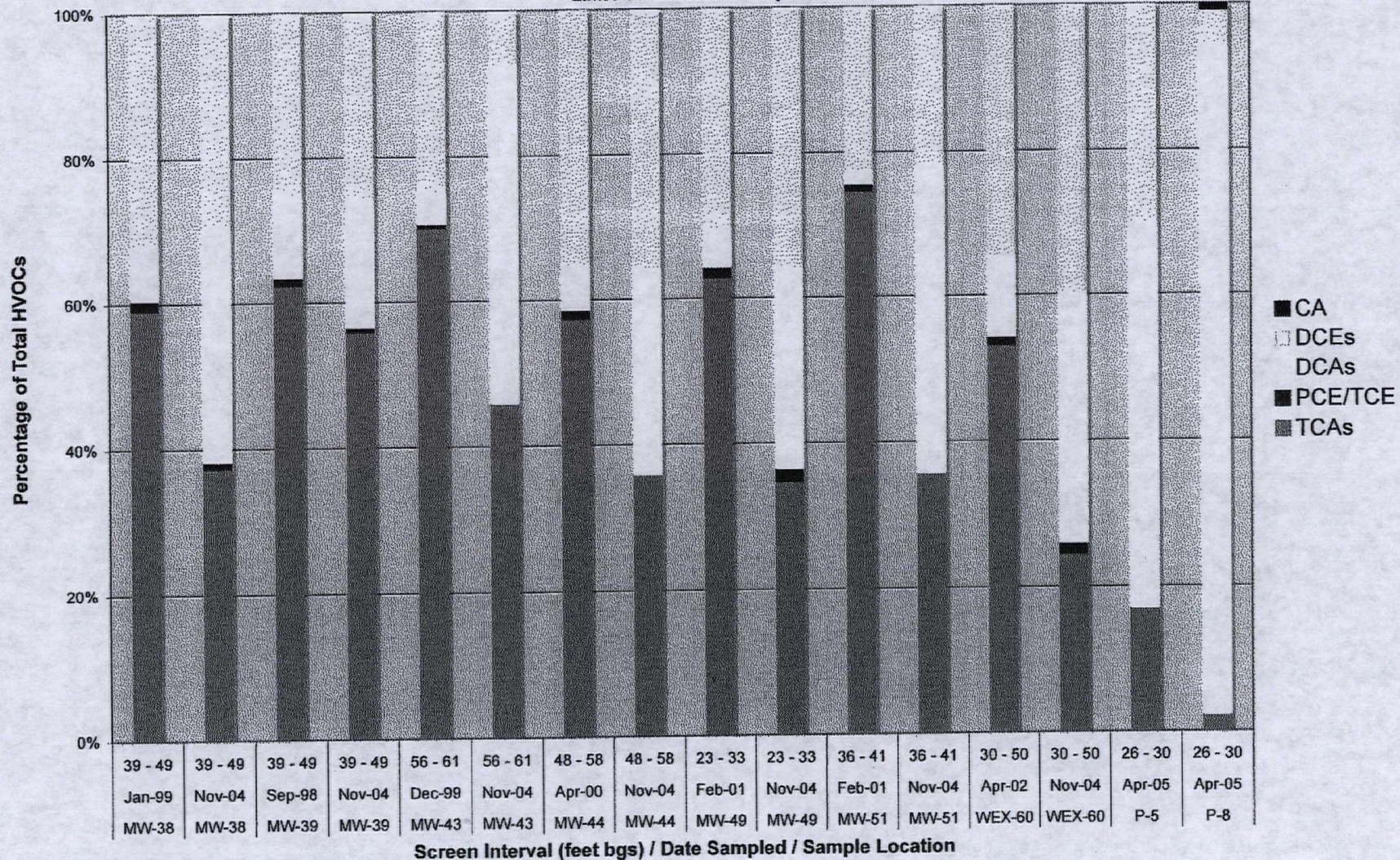


**ATTACHMENT 4**

**Chart 1 – HVOC Ratios in Groundwater**



CHART 1  
HVOC Ratios in Groundwater  
Lakeside/Gunderson Properties





**ATTACHMENT 5**

**Table 1 – Summary of Soil Testing Results**

**TABLE 1 – Summary of Soil Testing Results**

Sample Location	Sample Number <sup>1</sup>	Sample Date	Sample Depth (feet bgs)	Laboratory Testing Results in mg/kg (ppm)		
				NW TPH-Gx	NW Method TPH-Dx	
				Gasoline	Diesel	Oil
Reference Levels <sup>2</sup> ==>				80.	500.	500.
P-6	001	1-Apr-05	1.5 - 2.0	4. U	164.	50. U
P-6	004	1-Apr-05	11.0 - 11.5	10.7	342.	223.

bgs = below ground surface

DEQ = Oregon Department of Environmental Quality

HCID = hydrocarbon identification

mg/kg = milligrams/kilogram

NW = Northwest Method

ppm = parts per million

TPH = total petroleum hydrocarbons

U = not detected above concentration indicated

1 = Sample Number Prefix: 6235-050401-

2 = Reference Level based on DEQ Level 2 Soil Matrix Cleanup Standard (OAR 340-122-0335)

**Bold** = Concentration exceeds Reference Level



**ATTACHMENT 6**

**Table 2 – Summary of Groundwater Testing Results**

TABLE 2 - Summary of Groundwater Testing Results

Analytical Parameters	Analytical Testing Results in ug/L (ppb)					Reference Levels in ug/L (ppb)	
	P-5	P-5 (duplicate)	P-6	P-7	P-8	Human Health Screening Levels <sup>2</sup>	Ecological Screening Levels <sup>3</sup>
	Sample Location ==>	Sample Location ==>	Sample Location ==>	Sample Location ==>	Sample Location ==>	(Non-Residential)	
	Sample Number <sup>1</sup> ==>	Sample Number <sup>1</sup> ==>	Sample Number <sup>1</sup> ==>	Sample Number <sup>1</sup> ==>	Sample Number <sup>1</sup> ==>		
Screen Interval (feet ags) ==>	1-Apr-05	1-Apr-05	1-Apr-05	1-Apr-05	1-Apr-05		
	26.0 - 30.0	26.0 - 30.0	26.0 - 30.0	26.0 - 30.0	26.0 - 30.0		
<b>Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8270SIM</b>							
Acenaphthene	0.144	0.12 U	0.183	0.0259	0.0348	1,500	520
Acenaphthylene	0.01 U	0.02 U	0.01 U	0.01 U	0.0111 U		
Anthracene	0.01 U	0.19 U	0.09 U	0.01 U	0.0309	7,300	13
Benzo(a)anthracene	0.0606	0.0663	0.0387	0.021	0.0111 U	0.56	0.027
Benzo(a)pyrene	0.0192 J	0.0143 J	0.01 U	0.02 U	0.0111 U	0.056	0.014
Benzo(b)fluoranthene	0.018	0.0142 J	0.0117 J	0.01 U	0.0111 U	0.56	
Benzo(g,h,i)perylene	0.01 U	0.01 U	0.01 U	0.01 U	0.0111 U		
Benzo(k)fluoranthene	0.0208	0.0145 J	0.01 U	0.01 U	0.0111 U	5.6	
Chrysene	0.0441	0.0477	0.0334	0.0244	0.0163 J	56	
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.0111 U	0.056	
Fluoranthene	0.563	0.9	0.459	0.15	0.0772	5,800	6.16
Fluorene	0.167	0.16 U	0.197	0.0502	0.0455	970	3.9
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.0111 U	0.56	
Naphthalene	0.02 U	0.02 U	0.0602	0.0945	0.177	25	620
Phenanthrene	0.01 U	0.075 U	0.06 U	0.0564	0.0995		6.3
Pyrene	0.476	0.888	0.396	0.144	0.0767	4,400	
Total PAHs	1.51	1.93	1.36	0.57	0.56		
<b>Determined Volatile Organic Compounds (VOCs) by EPA Method 8260B</b>							
<b>Aromatic VOCs (AVOCs)</b>							
Benzene	1 U	1 U	1 U	1 U	10 U	2.2	130
Toluene	1 U	1 U	1 U	1 U	10 U	2,900	9.6
Ethylbenzene	1 U	1 U	1 U	1 U	10 U	5,400	7.3
Total Xylenes	2 U	2 U	2 U	2 U	20 U	520	13
Naphthalene	2 U	2 U	2 U	2 U	20 U	25	520
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U	10 U	49	
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U	10 U	49	
<b>Halogenated VOCs (HVOCs)</b>							
Chloroform	1 U	1 U	1 U	3.83	10 U	0.17 *	1,240
Chloroethane	1 U	1 U	1 U	1 U	12.9	4.6 *	
1,1-Dichloroethane (1,1-DCA)	7.7	7.6	1 U	1 U	1,150	810 *	47
1,2-Dichloroethane (1,2-DCA or EDC)	1 U	1 U	1 U	1 U	14.2	0.75	20,000
1,1,1-Trichloroethane (1,1,1-DCE)	4.38	4.34	1 U	1 U	37.4	1,400	25
cis-1,2-Dichloroethene (cis-1,2-DCE)	1 U	1 U	1 U	1 U	27.9	240	590
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	10 U	490	590
Tetrachloroethene (PCE)	1 U	1 U	1 U	1 U	10 U	0.63	840
1,1,1-Trichloroethane (TCA)	2.46	2.47	1 U	1.53	10 U	13,000	11
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	28.6	0.2 *	9,400
Trichloroethene (TCE)	1 U	1 U	1 U	1 U	10 U	0.17	3,000
Vinyl Chloride	1 U	1 U	1 U	1 U	10 U	0.49	1,300
Total HVOCs	14.6	14.4	0	5.4	1,282		
<b>Total (Unfiltered) Metals by EPA Method 8010 / 7000 Series</b>							
Arsenic	10.2	6.87	63.6	30	EB	0.045 *	150
Barium	408	260	7,030	1,270	9,860	2,600 *	4
Cadmium	1.16	1 U	9.5	2.19	8.83	18 *	2.2
Chromium	33.8	21.2	313	100	211	110 *	11
Lead	20.5	12.1	356	82	371	15	2.5
Mercury	0.2 U	0.2 U	0.528	0.2 U	0.756	3.6 *	0.77
Selenium	1.35	1.09	19.4	3.99	17.4	160 *	5
Silver	1 U	1 U	2.04	1 U	2.32	180 *	0.12
<b>Filtered Metals by EPA Method 6010 / 7000 Series (11-micron filter)</b>							
Arsenic	1 U	1 U	1 U	1.03	1 U	0.045 *	150
Barium	53.5	53.8	38.2	28.3	62.2	2,600 *	4
Cadmium	1 U	1 U	1 U	1 U	1 U	18 *	2.2
Chromium	1.3	1	1.06	1.51	1 U	110 *	11
Lead	1.36	1.33	1.95	1.47	1.49	15	2.5
Selenium	1 U	1 U	1 U	1 U	1 U	180 *	5
Silver	1 U	1 U	1 U	1 U	1 U	180 *	0.12
<b>Dissolved Metals by EPA Method 6010 / 7000 Series (0.45-micron filter)</b>							
Arsenic				1 U		0.045 *	150
Barium				24.3	61	2,600 *	4

Note: bps = below ground surface

DEQ = Oregon Department of Environmental Quality

EPA = U.S. Environmental Protection Agency

HVOCs = halogenated volatile organic compounds

J = estimated concentration

ppb = parts per billion

U = not detected above concentration (MDL) indicated

ug/L = micrograms/liter

VOCs = volatile organic compounds

1 = Sample Number Prefix: 6235-050401

7 = Lowest DEQ Non-Residential Risk-Based Concentrations (RBCs), September 2003, unless otherwise indicated

3 = OEO lowest Ecological Level II Screening Level Values (SLVs) for fresh surface water receptors

4 = EPA Region 9 Preliminary Remedial Goal (PRG) for Tap Water (Oct. 2004)

Bold = Concentration exceeds Human Health Screening Level

Underline = Concentration exceeds Ecological Screening Level

**ATTACHMENT 7**

Field Boring Logs

HAHN AND ASSOCIATES, INC.  
434 NW Sixth Avenue  
Portland, Oregon 97209  
(503) 796-0717

PUSH PROBE NUMBER

P-5

Page 1 of 2

PROJECT:  
Lakeside Industries  
4850 NW From Street  
Portland, Oregon

HAI LOGGER: Andy Rolinger  
SAMPLING METHOD: Continuous 5' Core  
DRILLING METHOD: Direct Push  
EQUIPMENT TYPE: GeoProbe 5400

DRILL START  
Time: 8:45  
Date: 1-Apr-05  
DRILL FINISH  
Time: 9:30  
Date:

PROJECT No 6235

DRILLING CONTRACTOR: Gao-Tech Explorations, Inc., a Division of Boart

ABANDONMENT DETAILS	SAMPLE NUMBER *	TIME	HEADSPACE (ppm)	LAB RESULT NWTPH-Dx (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCS)	BORING DIAMETER: 2"	CASING DIAMETER: N/A	SURFACE ELEVATION: Not Surveyed	TOP OF CASING ELEVATION: N/A	SOIL DESCRIPTION
Bentonite Chips							1			GP					GRAVEL (G) - Brown, subrounded to very angular gravels (aggregate) no OSD
							2								
		8:55	0.0				3			SP					SAND (SP) - Brown, fine to medium sand grains, poorly graded, no OSD
							4								
							5								
							6								
							7			ML					Sandy SILT (ML) - Brown silt with very fine sand grains, medium stiff, non-plastic, no OSD, moist, few woody rootlets
							8								
		9:00	0.0				9								
							10								
							11								
							12			ML					Sandy SILT (ML) - Brown silt with very fine sand grains, medium stiff, moist, few woody rootlets, non-plastic, no OSD.
							13								
		9:05	0.0				14								
							15								
							16			ML					Sandy SILT (ML) - Brown with orange and white zones, AA, no OSD
		9:15	0.0				17								
							18								
							19			SI					SAND (SP) - Brown fine to very fine sand grains, loose, poorly graded, no OSD
							20								

\* Sample No. Prefix: 235-050401

GW Sample Info: 100

101 (dup)

AA = as above  
OSD = odor, sheen by sheen test, discoloration



HAHN AND ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon 97209 (503) 796-0717				<b>PUSH PROBE NUMBER</b>				<b>P-5</b>		Page <u>2</u> of <u>2</u>					
<b>PROJECT:</b> Lakeside Industries 4850 NW Front Street Portland, Oregon				<b>HAI LOGGER:</b> Andy Rolinger <b>SAMPLING METHOD:</b> Continuous 5' Core <b>DRILLING METHOD:</b> Direct Push <b>EQUIPMENT TYPE:</b> GeoProbe 5400 <b>DRILLER:</b> Marcus Johnson <b>DRILLING CONTRACTOR:</b> Geo-Tech Explorations, Inc., a Division of Boart				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"><b>DRILL START</b></td> <td style="width:50%;"><b>DRILL FINISH</b></td> </tr> <tr> <td><b>Time:</b> 8:45</td> <td><b>Time:</b> 9:30</td> </tr> <tr> <td><b>Date:</b> 1-Apr-05</td> <td><b>Date:</b></td> </tr> </table>		<b>DRILL START</b>	<b>DRILL FINISH</b>	<b>Time:</b> 8:45	<b>Time:</b> 9:30	<b>Date:</b> 1-Apr-05	<b>Date:</b>
<b>DRILL START</b>	<b>DRILL FINISH</b>														
<b>Time:</b> 8:45	<b>Time:</b> 9:30														
<b>Date:</b> 1-Apr-05	<b>Date:</b>														
<b>PROJECT No.</b> 6235				<b>DRILLING CONTRACTOR:</b> Geo-Tech Explorations, Inc., a Division of Boart				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"><b>BORING DIAMETER:</b> 2"</td> <td style="width:50%;"><b>CASING DIAMETER:</b> N/A</td> </tr> <tr> <td><b>SURFACE ELEVATION:</b> Not Surveyed</td> <td><b>TOP OF CASING ELEVATION:</b> N/A</td> </tr> </table>		<b>BORING DIAMETER:</b> 2"	<b>CASING DIAMETER:</b> N/A	<b>SURFACE ELEVATION:</b> Not Surveyed	<b>TOP OF CASING ELEVATION:</b> N/A		
<b>BORING DIAMETER:</b> 2"	<b>CASING DIAMETER:</b> N/A														
<b>SURFACE ELEVATION:</b> Not Surveyed	<b>TOP OF CASING ELEVATION:</b> N/A														

ABANDONMENT DETAILS	SAMPLE NUMBER *	TIME	HEADSPACE (ppm)	LAB RESULT NW/TPH-Dx (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCE)	SOIL DESCRIPTION
← Bentonite Chips →							21				SM Silty SAND(SM) - Brown fine to very fine sand grains with silts, slightly plastic, soft, moist, no OSD.
	1	9:20	0.0				22				
							23				
							24				
							25				
							26				
							27				
							28				
							29				
							30				
		9:30	0.0				31				SM Silty SAND(SM) - Brown, AA, no OSD. WET
						32					
						33					
						34					
						35					
						36					
						37					
						38					
						39					
						40					

\* Sample No. Prefix: 6235-050401 - GW Sample Info: 100

101(dup)

AA = as above  
OSD = odor, sheen by sheen test, discoloration

HAHN AND ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon 97209 (503) 796-0717				<b>PUSH PROBE NUMBER</b>				<b>P-6</b>		Page 1 of 2	
PROJECT: Lakeside Industries 4850 NW Front Street Portland, Oregon				HAI LOGGER: Andy Rolinger SAMPLING METHOD: Continuous 5' Core DRILLING METHOD: Direct Push EQUIPMENT TYPE: GeoProbe 5400 DRILLER: <i>Martins Johnson</i> DRILLING CONTRACTOR: Geo-Tech Explorations, Inc., a Division of Boan				DRILL START Time: 10:30 Date: 1-Apr-05		DRILL FINISH Time: 11:20 Date:	
PROJECT No. 5235											

ABANDONMENT DETAILS	SAMPLE NUMBER *	TIME	HEADSPACE (ppm)	LAB RESULT NWTPH-Dx (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCS)	SOIL DESCRIPTION
<div style="writing-mode: vertical-rl; transform: rotate(180deg);">Bentonite Chips</div>							1			GP	GRAVEL (GP) - sub rounded to very angular gravel, brown, no OSB (aggregate)
	001	10:55	14.4				2			SP	SAND (SP) - Grey fine to med. sand grains, poorly graded, slight petroleum odor, sheen
	002	11:00	1.6				3			ML	Sandy SILT (ML) - Brown silt with very fine sand grains, stiff, no ist, no OSB
							4				
							5				
	003	11:00	2.2				6			ML	Sandy SILT (ML) - Brown, AA, no OSB.
							7				
							8				
							9				
							10				
	004	11:10	12.1				11			ML	Sandy SILT (ML) - brown, AA, except grey zone from 11-12', slight PHC odor, no sheen
							12				
							13				
							14				
							15				
	005	11:15	0.2				16			ML	Sandy SILT (ML) - brown, AA, no OSB.
							17				
							18				
							19				
							20				

\* Sample No. Prefix: 6235-050401

GW Sample Info: 102

AA = as above  
 OSO = odor, sheen by sheen test discoloration

HAHN AND ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon 97209 (503) 796-0717				PUSH PROBE NUMBER <b>P-6</b>				Page <b>2</b> of <b>2</b>	
PROJECT: Lakeside Industries 4850 NW Front Street Portland, Oregon				HAI LOGGER: <b>Andy Roinger</b> SAMPLING METHOD: <b>Continuous 5' Core</b> DRILLING METHOD: <b>Direct Push</b> EQUIPMENT TYPE: <b>GeoProbe 5400</b> DRILLER: <b>Marcus Johnson</b> DRILLING CONTRACTOR: <b>Geo-Tech Explorations, Inc., a Division of Boan</b>				DRILL START Time: <b>10:30</b> Date: <b>1-Apr-05</b>	
PROJECT No. <b>6235</b>				DRILL FINISH Time: <b>11:20</b> Date: <b>1-Apr-05</b>					

ABANDONMENT DETAILS	SAMPLE NUMBER	TIME	HEADSPACE (ppm)	LAB RESULT NMTPH-Dx (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCSI)	BORING DIAMETER: <b>2"</b> CASING DIAMETER: <b>N/A</b> SURFACE ELEVATION: <b>Not Surveyed</b> TOP OF CASING ELEVATION: <b>N/A</b> SOIL DESCRIPTION
Bentrite Chips ↓					↑	↑	21			<b>ML</b>	<b>Sandy SILT - Brown, AA, no OSD</b>
							22				
							23				
							24				
			<b>11:20 D.O.</b>		↓	↓	25				
							26				
							27				
							28				
							29				
							30				
		<b>11:20 D.O.</b>		↓	↓	30				<b>ML</b>	<b>Sandy SILT - Brown, AA, no OSD</b>
						31					
						32					
						33					
						34					
						35					
						36					
						37					
						38					
						39					
						40					

Sample No. Prefix: **6235-050401**

GW Sample Info: **103**

AA = as above  
OSD = odor, sheen by sheen test, discoloration

HAHN AND ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon 97209 (503) 795-0717		PUSH PROBE NUMBER P-7		Page 1 of 2							
PROJECT Lakeside Industries 4850 NW Front Street Portland, Oregon		HAI LOGGER: Andy Roiinger		DRILL START	DRILL FINISH						
PROJECT No. 5235		SAMPLING METHOD: Continuous 5' Core		Time: 12:05	Time: 1:30						
		DRILLING METHOD: Direct Push		Date: 1-Apr-05	Date: 1-Apr-05						
		EQUIPMENT TYPE: GeoProbe 5400									
		DRILLER: Marcus Johnson									
		DRILLING CONTRACTOR: Geo-Tech Explorations, Inc., a Division of Boart									
ABANDONMENT DETAILS	SAMPLE NUMBER *	TIME	HEADSPACE (ppm)	LAB RESULT NWTPH-Dx (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Chips					↑	↑	1			GP	GRAVEL (GP) - Brown sub-rounded to very angular gravels.
							2				
							3			SP	SAND (SP) - Brown fine to medium sand grains, poorly graded, no OSD.
		12:10	0.0			↓	4				
							5				
						↑	6			SP	SAND (SP) - Brown, AA, no OSD.
							7				
							8			ML	Sandy SILT (ML) - Brown silt with very fine sand grains, med plastic, stiff, few woody rootlets, no OSD.
		12:15	0.0			↓	9				
							10				
						↑	11			ML	Sandy SILT (ML) - Brown, AA, no OSD.
							12				
						↓	13				
		12:20	0.0				14				
							15				
						↑	16			ML	Sandy SILT (ML) - Brown, AA, no OSD.
							17				
						↓	18			SP	SAND - Brown, fine to very fine sand grains, loose, poorly graded, no OSD.
		12:30	0.0				19				
							20				

\* Sample No. Prefix: 6235-050401

GW Sample Info: 103

AA = as above  
OSD = odor, sheen by sheen test discoloration



HAHN AND ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon 97209 (503) 796-0717				<b>PUSH PROBE NUMBER</b>				P-7 Page 2 of 2	
PROJECT Lakeside Industries 4850 NW Front Street Portland, Oregon				HAI LOGGERS: Andy Rolinger SAMPLING METHOD: Continuous 5' Core DRILLING METHOD: Direct Push EQUIPMENT TYPE: GeoProbe 5400 DRILLER: <i>Markus Johnson</i>				DRILL START Time: 12:05 Date: 1-Apr-05	
PROJECT No. 5235				DRILLING CONTRACTOR: Geo-Tech Explorations, Inc., a Division of Boart				DRILL FINISH Time: 1:30 Date:	

ABANDONMENT DETAILS	SAMPLE NUMBER *	TIME	HEADSPACE (ppm)	LAB RESULT NVTPH-Dx (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCS)	BORING DIAMETER: 2"	CASING DIAMETER: N/A	SURFACE ELEVATION: Not Surveyed	TOP OF CASING ELEVATION: N/A	SOIL DESCRIPTION
← Bentonite Chips →					↑	↓	21			SM	Silty SAND(SM) - Brown fine sand to very fine sand grain with silts, slightly plastic, soft, moist, no OSD.				
							22								
							23								
							24								
							25								
							26								
							27								
							28								
							29								
							30								
					↑	↓	31			SM	Silty SAND(SM) - Brown, AA, wet.				
							32								
							33								
							34								
							35								
							36								
							37								
							38								
							39								
							40								

\* Sample No. Prefix: 6235-0504 01

GW Sample info: 103

AA = as above  
OSD = odor, sheen by sheen test, discoloration

HAHN AND ASSOCIATES, INC.  
434 NW Sixth Avenue  
Portland, Oregon 97209  
(503) 796-0717

PUSH PROBE NUMBER

P-8

Page 1 of 2

PROJECT  
Lakeside Industries  
4850 NW Front Street  
Portland, Oregon

HAI LOGGER: Andy Roilinger  
SAMPLING METHOD: Continuous 5' Core  
DRILLING METHOD: Direct Push  
EQUIPMENT TYPE: GeoProbe 5400

DRILL START  
Time: 1:50  
Date: 1-Apr-05  
DRILL FINISH  
Time: 2:15  
Date: →

PROJECT No. S235

DRILLER: Marcus Johnson  
DRILLING CONTRACTOR: Geo-Tech Explorations, Inc., a Division of Boart

ABANDONMENT DETAILS	SAMPLE NUMBER *	TIME	HEADSPACE (ppm)	LAB RESULT NH <sub>4</sub> PH-Ox (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCS)	BORING DIAMETER: 2"	CASING DIAMETER: N/A	SURFACE ELEVATION: Not Surveyed	TOP OF CASING ELEVATION: N/A	SOIL DESCRIPTION
← Bentonite Chips →					↑	↓	1								GRAVEL (GP) - Gray - Brown sub
					↑	↓	2								rounded to very angular
					↑	↓	3								grains, no OSD
					↑	↓	4								
					↑	↓	5								
					↑	↓	6								
					↑	↓	7								NO RECOVERY
					↑	↓	8								
					↑	↓	9								
					↑	↓	10								
	007	2:20	0.0		↑	↑	11								Sandy SILT (ML) - Brown
					↑	↑	12			ML					Silt with very fine sand
					↑	↑	13								grains, moist, slightly
					↑	↑	14								plastic, no OSD
					↑	↑	15								
	—	2:25	0.0		↑	↑	16			ML					Sandy SILT (ML) - Brown, AA
					↑	↑	17								no OSD
					↑	↑	18								
					↑	↑	19			SA					Silty SAND (SM) - Brown fine
					↑	↑	20								to very fine sand grains
					↑	↑									with s. H. non-plastic,
					↑	↑									loose, no OSD

\* Sample No. Prefix: 6235-050401

GW Sample Info: 104

AA = as above  
OSD = odor, sheen by sheen test, discoloration

HAHN AND ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon 97209 (503) 796-0717				PUSH PROBE NUMBER <b>P-8</b>				Page <b>2 of 2</b>			
PROJECT: Lakeside Industries 4850 NW Front Street Portland, Oregon				HAI LOGGER: Andy Roinger SAMPLING METHOD: Continuous 5' Core DRILLING METHOD: Direct Push EQUIPMENT TYPE: GeoProbe 5400 DRILLER: <i>Marinus Johnson</i>				DRILL START Time: 1:50 Date: 1-Apr-05	DRILL FINISH Time: 2:45 Date:		
PROJECT No. 5235				DRILLING CONTRACTOR: Geo-Tech Explorations, Inc., a Division of Boart							
ABANDONMENT DETAILS	SAMPLE NUMBER	TIME	HEADSPACE (ppm)	LAB RESULT NWTPI-Dx (ppm)	CORE INTERVAL	% RECOVERY	DEPTH (feet bgs)	GROUNDWATER	IMPACTED ZONE	STRATA (USCS)	BORING DIAMETER: 2" CASING DIAMETER: N/A SURFACE ELEVATION: Not Surveyed TOP OF CASING ELEVATION: N/A
Bentonite Chips ↑ ↓							21			SM	Silty SAND (SM) - Brown, AA, no OSD
							22				
		2:30	0.0				23				
							24				
		2:55	0.0				25				
							26				
							27				
							28				
							29				
							30				
						31					
						32					
						33					
						34					
						35					
						36					
						37					
						38					
						39					
						40					

\* Sample No. Prefix: **6235-050401**

GW Sample Info: **104**

AA = as above  
 OSD = odor, sheen by sheen test, discoloration

**ATTACHMENT 8**

Analytical Laboratory Reports and Chain of Custodies